



## 2006 Shutdown

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# Run I Ib Shutdown Activities

- Install and commission Layer 0 detector
- Replace current Level 1 Calorimeter trigger with L1Cal trigger upgrade
- Replace current DFEAs in Level 1 Central Track Trigger with DFEA2
- Complete cabling/commissioning of Level 1 Calorimeter Track Match trigger
- Complete modifications to Level 2 Silicon Track Trigger to accommodate Layer 0 inputs
- Complete hardware modifications to muon Proportional Drift Tube readout to accommodate latency shift
- Refine V15 trigger list for post shutdown running
- Complete platform testing of pre-production AFEII-t readout boards for the Central Fiber Tracker



# Some Additional Shutdown Activities

- Preparation for latency shift
- Routine subsystem maintenance and improvements
- Individual channel recoveries
- Silicon Microstrip Tracker
  - HDI recovery effort
  - Install additional BLM to accommodate testing of BLM readout upgrade
- Central Fiber Tracker
  - New SBC in crate 0x52
- Calorimeter
  - Cable harness checks
  - Noise studies
  - Inter Cryostat Detector preamp modifications (and some phototube replacements)
- Muon system
  - Source calibrations, HV calibrations, cable improvements, modifications to VME power supplies to improve radiation resistance
- Level 1 Muon Trigger
  - Improve power supplies
- Luminosity Monitoring
  - Detector maintenance

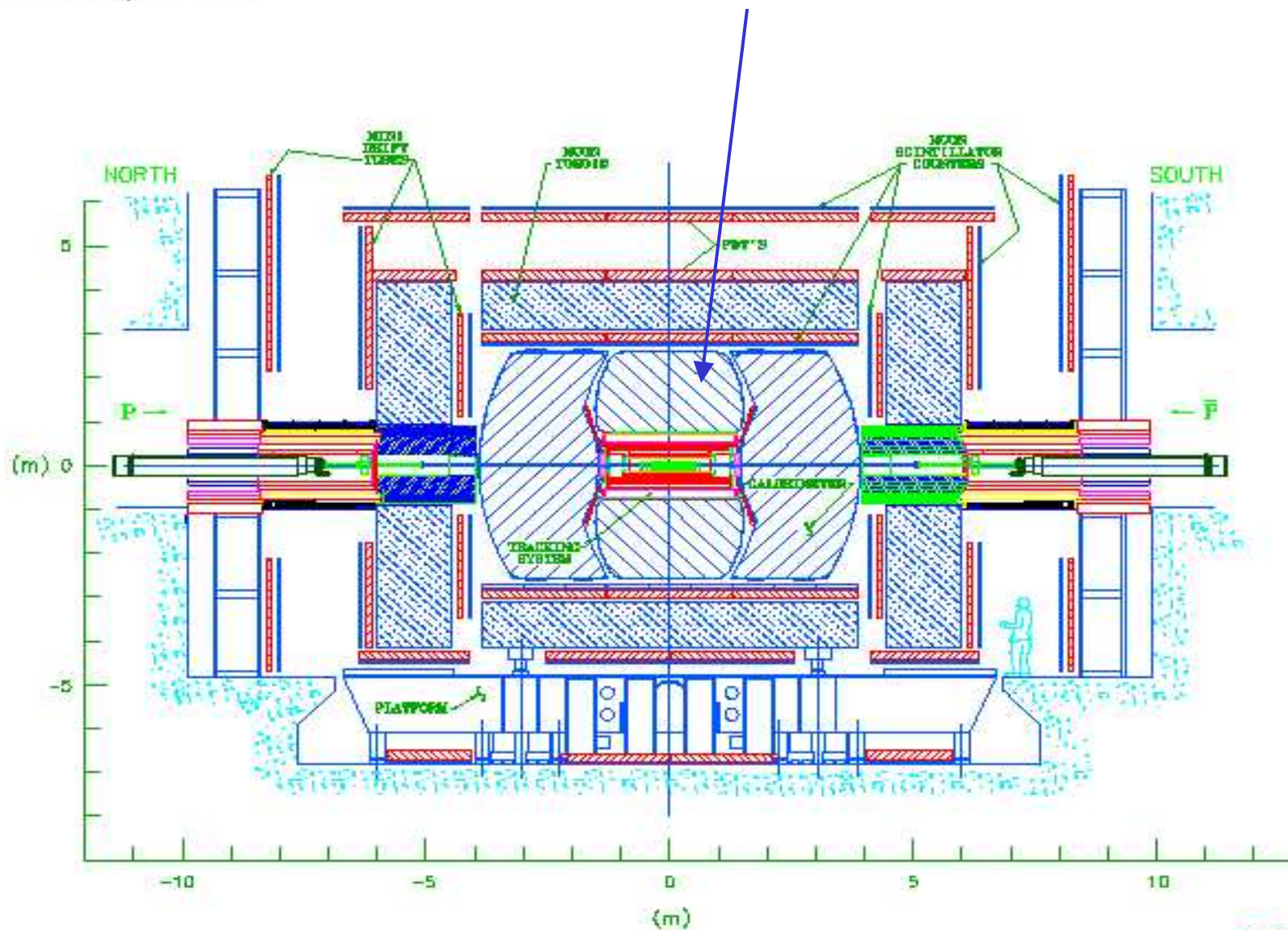


# Layer 0 Silicon

- Detector
  - Additional layer of silicon detectors designed to fit inside the current Silicon Microstrip Tracker
    - Mitigate tracking losses due to radiation damage and detector aging
    - Provides more robust tracking and pattern recognition to accommodate higher instantaneous luminosities
    - Improves impact parameter resolution
  - 12288 channels
- Installation Overview
  - Tight clearances ( $\sim 1\text{mm}$ ) and substantial work handling and surrounded by delicate components
    - Requires detailed planning, numerous detector reconfigurations, and significant expertise, tooling and technique development and testing
  - Compromises Tevatron vacuum
  - Requires significant collision hall access
    - Our estimate of installation duration originally determined Tevatron shutdown duration

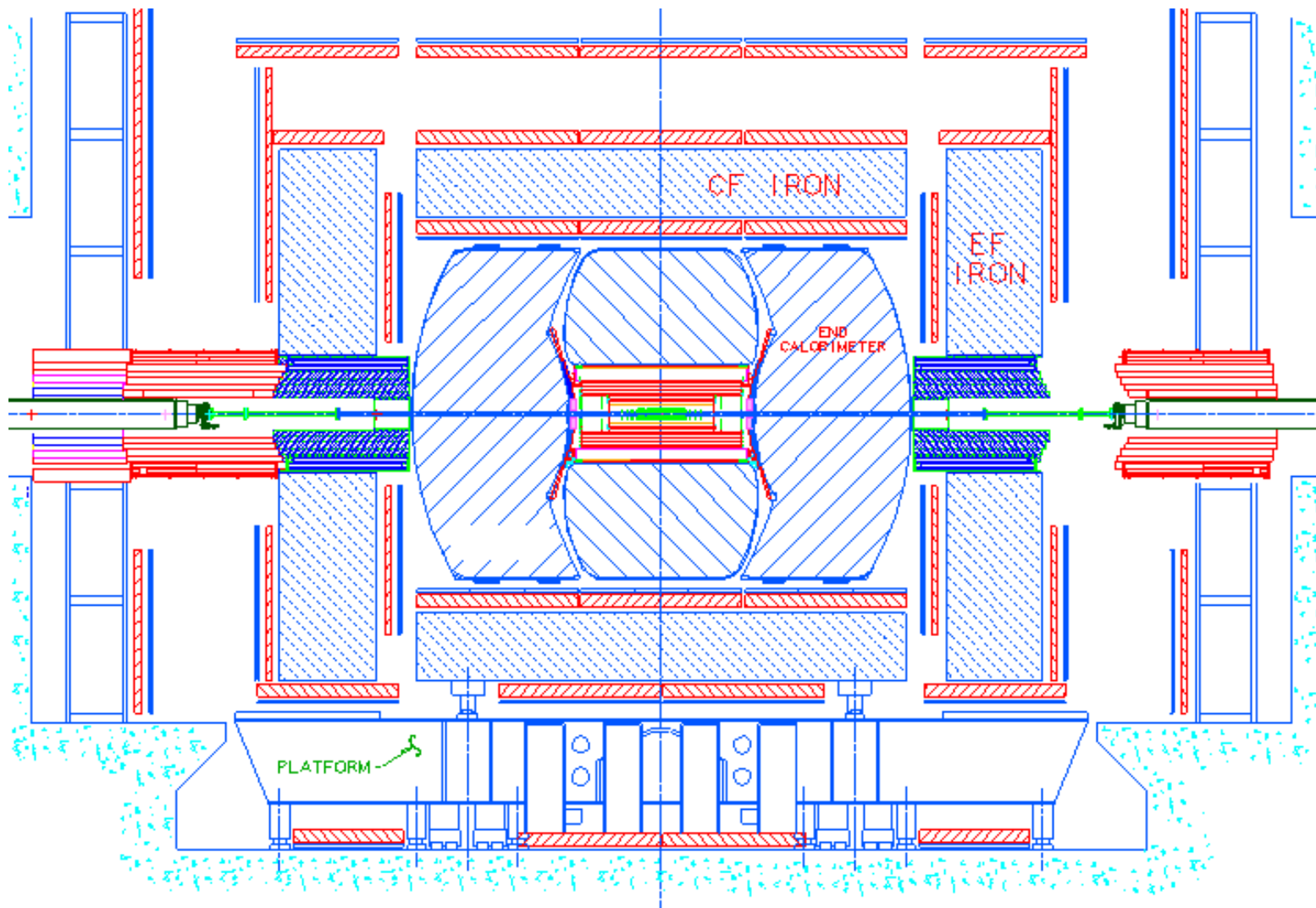


# Closed Configuration





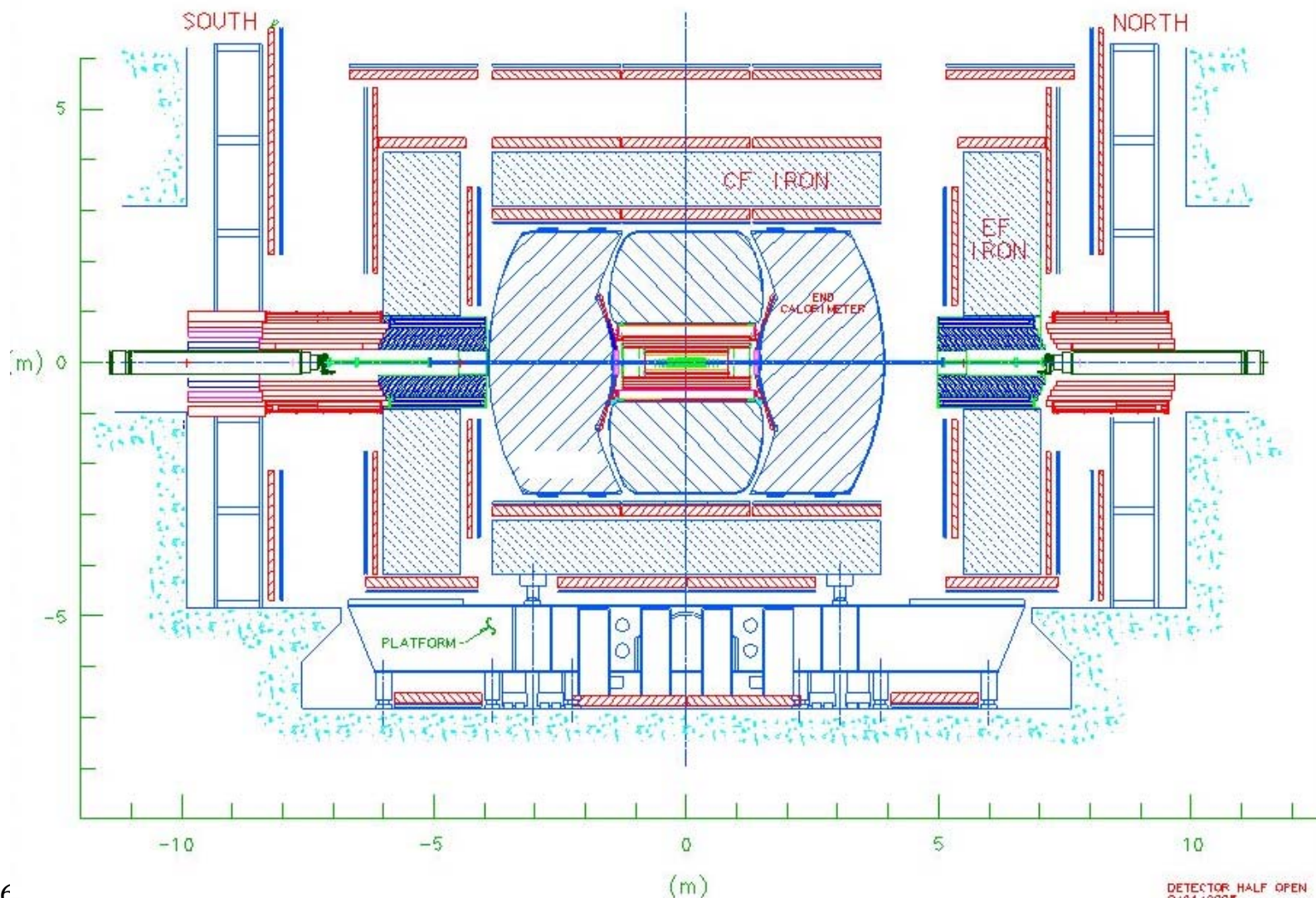
# Clam shells and muon shielding open on north end





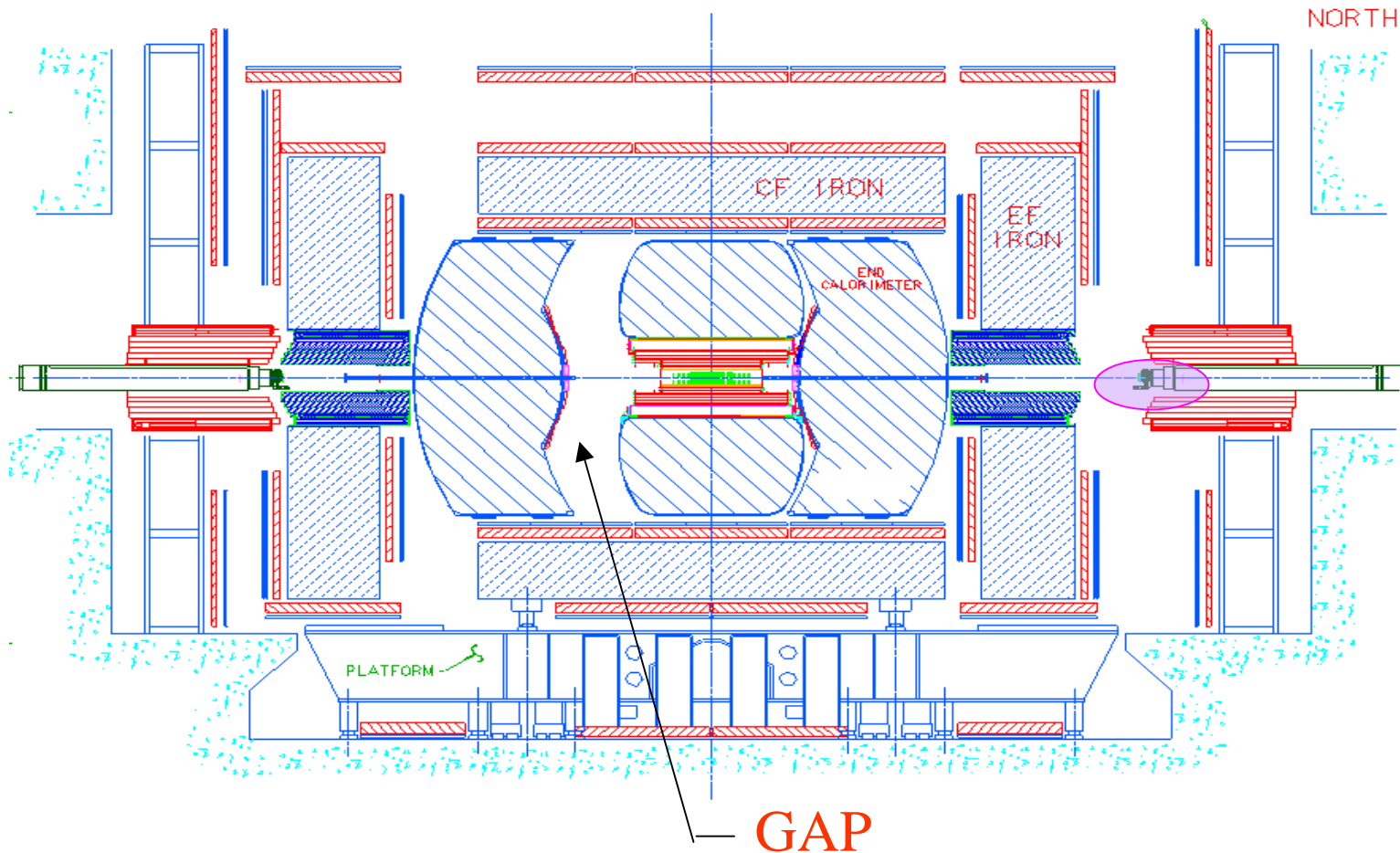


# North EF open too





## South EF and EC open allowing access to the south gap (assuming CF is also open)







# Layer 0 Installation Milestones

ID	TASK NAME	Actual	Current Forecast	Pre-Shutdown Forecast	Milestones
2	Beginning of RunIIb Tevatron Shutdown	2/23/06		2/27/06	2/27/06
28	Detector Open, Ready for Access	3/01/06		3/02/06	3/07/06
34	RunIIa Be Beam Pipe Disconnected	3/3/06		3/7/06	3/9/06
47	H Disks Removed		3/16/06	3/17/06	3/23/06
56	RunIIa Be Beam Pipe Removed		3/24/06	3/27/06	3/31/06
75	Layer 0 Tooling and Mounts Ready		4/7/06	4/10/06	4/17/06
79	Layer 0 Installed		4/11/06	4/12/06	4/19/06
91	RunIIb Be Pipe Connected, Layer 0 Cabled		4/25/06	4/26/06	5/03/06
94	Inner H Disks Re-Installed		5/1/06	5/2/06	5/9/06
99	Silicon Cold and Ready for Technical Commissioning		5/4/06	5/5/06	5/12/06
103	Complete Technical Commissioning of Silicon		5/10/06	5/11/06	5/18/06
118	Detector Closed for Tevatron Resumption		6/01/06	6/02/06	6/4/06



# L1 Calorimeter Trigger

- Level 1 Calorimeter Trigger Upgrade
  - Replace 10 racks of Run I calorimeter trigger electronics
    - 80 Analog to Digital Filters (ADFs)
    - 8 Trigger Algorithm Boards (TABs)
    - 1 Global Algorithm Board (GAB)
    - Sharpens trigger turn-on curves
    - Provides specific object ID at Level 1 (electrons, jets, taus)
- Installation Overview
  - Does not require collision hall access
    - Trigger racks located in Movable Counting House
  - However, new electronics physically displaces current Level 1 Calorimeter trigger electronics
  - Decommissioning of current L1Cal trigger started after beam pipe was uncoupled (to facilitate calorimeter noise studies)
  - Installation duration ~10 weeks



# Central Track Trigger

- Level 1 Central Track Trigger Upgrade
  - Replace 40 Digital Front End Boards and associated infrastructure with DFEA2
    - improve fake rejection capability of Central Track Trigger at higher occupancies due to increasing instantaneous luminosities
      - makes use of full granularity of Central Fiber Tracker inputs
- Installation Overview
  - Requires several weeks of collision hall access to remove current boards and install replacements
    - Activity on platform will not interfere with Layer 0 installation
  - Requires intermittent access thereafter for debugging and verification of cabling
  - Installation duration ~9 weeks



# Additional Trigger Upgrades

- Level 1 Calorimeter Track Match
  - Electronics to provide new capability to match calorimeter and track objects at Level 1
    - Improved rejection and tau triggering capability
  - Requires change in trigger timing to implement this trigger upgrade
    - Latency measurements complete
    - Will require delay by  $3 \times 132 \text{ nsec}$ 
      - Muon system Proportional Drift Tube COBO must be modified to accommodate this change
- Level 2 Silicon Track Trigger
  - Additional electronics to include Layer 0 detector inputs in Silicon Track Trigger
  - To be installed in Movable Counting House
- Level 2 Processor Upgrades
  - Facilitates handling of more complex events and implementation of improved algorithms
  - Installation in progress (no collision hall access required)



## Summary of First Week Activities

- Major activities are related to reconfiguring the detector to allow access to the gap region and preparing to open the beam pipe
- Stick mic survey of detector location (Alignment)
- Open EF to lock EC beam pipe in location
- Close EF
- Remove SNEG beampipe supports (AD support)
- Install remotely activated collapsible beam pipe spacer
- Open detector (EF, CF, EC)
- Raise temperature of silicon coolant
- Install gap access hardware
- Prepare for disconnecting beryllium beam pipe
- Cut flanges off inside end of EC beam pipes





## Summary

- Shutdown involves substantial parallel efforts to install Run IIb upgrades of the DZero detector and make a smooth transition to commissioning and operations
- The Layer 0 installation schedule includes ~20% schedule contingency in the 14 week shutdown duration
  - Resources identified and preparing for the installation
    - backups for key Layer 0 installation team trained
- Need to complete these activities in a timely manner
  - Lab is providing significant support